

**Oroville Facilities Relicensing Efforts
Environmental Work Group
Draft Narrative Report for PM&E Discussion**

Resource Action: EWG-74

Task Force Recommendation Category: 2

**CONTROL AND/OR ERADICATION OF NOXIOUS PLANT SPECIES IN
THE PROJECT AREA**

Description of Potential Resource Action:

This Resource Action involves the eradication and/or control of noxious plant species (except purple loosestrife) within the Project Area and restoration/replanting with appropriate native plants. This includes the Oroville Wildlife Area (OWA), areas around Lake Oroville, and the Thermalito Complex. The species of greatest concern in the Thermalito Complex and the OWA are tree of heaven (*Ailanthus altissima*), giant reed (*Arundo donax*), and scarlet wisteria (*Sesbania punicea*). Other non-native species of concern found in these areas include Himalayan blackberry (*Rubus discolor*), wild fennel (*Foeniculum vulgare*), yellow starthistle (*Centaurea solstitialis*), pampas grass (*Cortaderia selloana*), edible fig (*Ficus carica*), Bermuda grass (*Cynodon dactylon*), black locust (*Robinia pseudoacacia*), and periwinkle (*Vinca major*). The species of greatest concern around Lake Oroville are skeletonweed (*Chondrilla juncea*), French broom (*Genista monspessulana*), Spanish broom (*Spartium junceum*), Scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus discolor*), edible fig (*Ficus carica*), and tree of heaven (*Ailanthus altissima*).

Control methods will include a combination of mechanical, manual, and chemical efforts. Most species will need multiple-year treatments and monitoring. Treatments are expected to be more intense the first year, lessening in both labor and chemical costs in each succeeding year.

There are two parts to this Resource Action: 1) control of noxious weed species and 2) restoration with native plants. A number of resource actions target noxious weeds in the project-affected area. The original resource actions listed below (EWG-70, EWG-73, EWG-74A/B, EWG-75, and EWG-76) addressed weed control in different areas of the project-affected area (i.e., OWA, Thermalito Complex, Lake Oroville, Feather River). These have been combined so that EWG-74 addresses all weeds within the project area except purple loosestrife. EWG-73 addresses purple loosestrife control. EWG-70 targets the low flow section of the Feather River and EWG-75 addresses water primrose in the OWA.

- EWG-70: proposes to control noxious weed species in the Low Flow channel of the Feather River.
- EWG-74A: proposes to control noxious weed species and to replant with native species in the OWA.
- EWG-74B: proposes to control noxious weed species and to replant with native species around Lake Oroville.

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- EWG-75: proposes to control the spread of noxious plant species (water primrose) in the OWA by developing management protocols.
- EWG-76: proposes to control noxious plant species in the OWA by altering the hydrologic regime to one that would support and protect native riparian vegetation.

Nexus to Project:

Fluctuating water levels in the Thermalito Complex and in Lake Oroville and managed flows in the low flow section of the Feather River promote the proliferation of non-native noxious weed species along the wetland margins, river banks, and in the adjacent floodplain. Maintenance and other land disturbing activities promote the proliferation of invasive plant species in uplands and wetland/riparian areas.

Potential Environmental Benefits:

Control of noxious weed species and replacement with native plant species would enhance native vegetation and its associated wildlife. Eradication and/or control of these species in the Oroville Wildlife Area will help to reduce the number of seeds and/or plant parts that can invade other sensitive resources and habitats, especially riparian habitats downstream of the OWA.

Potential Constraints:

- The presence of threatened or endangered species and/or critical habitat
- The presence of special status plant species
- Timing of treatments that coincide with restrictions that may be identified during USFWS or NOAA consultations
- Presence of cultural resources

Existing Conditions in the Proposed Resource Action Implementation Area:

Noxious weed species occur throughout the Project area. Many of these weeds are common invaders throughout California and have been in this area for many years. Others such as scarlet wisteria have recently colonized the area and are rapidly expanding their range. Most are associated with disturbance.

Weed species were mapped by DWR personnel during 2002 and 2003. Although most species are known throughout the project area, some are more of a problem in particular areas (i.e., tree of heaven in riparian areas especially near elderberries). Species that are of more concern around Lake Oroville are different than those identified as important pests below the dam.

Numerous noxious weed species occur around Lake Oroville, primarily in disturbed areas near roads, trails, and facilities, and in the immediate vicinity of the spillway and the associated power facilities. The species identified as those of greatest concern are skeleton weed; French, Spanish, and Scotch brooms; Himalayan berry; and tree of heaven. Other species include edible fig, and star thistle.

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Around the Thermalito Complex, purple loosestrife has been identified as the major threat to native vegetation and wildlife. This species has been addressed in a separate Resource Action, EWG-73. Other species of concern near the Afterbay, Forebay, and Diversion pool include giant cane, tree of heaven, star thistle, scarlet wisteria, medusa head, and many other herbaceous and woody species. Around the Thermalito Complex, concentrations of non-native woody species are highest in the South Afterbay areas, probably related to old homesteads. Although the majority of these species are not widespread, many are concentrated enough to impact native vegetation and wildlife habitat and have potential to expand. Within the grasslands, star thistle and medusa head are the most widespread and have most likely impacted native plant species to the greatest extent.

Noxious weed species occur throughout the Oroville Wildlife Area. Although many non-native species were mapped during 2002 and 2003 surveys, the species identified as those of greatest concern include tree of heaven, purple loosestrife, giant reed, and scarlet wisteria. Other noxious weed species of concern found within the OWA include parrots feather, wild fennel, Pampas grass, edible fig, black locust, periwinkle, yellow star thistle, Bermuda grass, and Himalayan blackberry. These species are common throughout the OWA, but not as widespread.

There is currently no overall weed management plan for the Project area. The Oroville Field Division does some routine herbicide treatments along roads and near facilities. The Department of Parks and Recreation also has regular treatments for certain species near roads, some trails, and recreation facilities. The Department of Fish and Game currently is not treating any weed species in the OWA or Thermalito Afterbay.

Design Considerations and Evaluation:

The type and timing of control efforts will vary depending upon the target species. Some species have very specific time frames for control. According to Bell (1997) application of herbicides to giant reed is most effective during mid-August to November. Application of herbicides to cut stumps of tree of heaven is most effective at the end of the growing season. For Himalayan blackberry, mowing at flowering, immediately followed by application of herbicides to cut stumps is the recommended treatment. For others, no specific timing of efforts is indicated. In order to keep costs down, control efforts for all target species should be combined to the extent possible.

Control efforts will need to be a yearly event. However, it is estimated that efforts will be more concentrated in the first year or two, with lighter follow-up controls in each of the following years as eradication and/or control of the populations are achieved. A monitoring regime should be put in place that will inventory and map priority weed species as well as identify the effectiveness of the control methods. The monitoring program should identify areas where native plants are not naturally regenerating and need to have follow-up restoration at the site.

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Restoration:

Restoring/planting with native species may be necessary following control treatments of some species. Control treatments for species such as scarlet wisteria, giant reed, and tree of heaven may involve cutting the stalks or trunks and applying an herbicide to kill the entire plant including the root mass. In some areas where the infestation density is high, stump removal may be necessary. These areas should be replanted with native species. Removal and planting will not only help reduce erosion and speed up the restoration process, but may also shade out seedlings of non-native species and help prevent reestablishment. Appropriate native woody species that can be used in riparian areas of the OWA include white alder (*Alnus rhombifolia*), willow species (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), Western sycamore (*Platanus racemosa*), box elder (*Acer negundo*), and Oregon ash (*Fraxinus latifolia*). A number of other herbaceous/non-tree perennial species can be used in wetland/riparian areas including sedges (*Carex* sp.), rushes (*Juncus* sp.), deer grass (*Muhlenbergia rigens*), mugwort (*Artemisia douglasiana*), mule fat (*Baccharis salicifolia*), and coyote bush (*Baccharis pilularis*).

Permitting:

Consultations with NOAA and USFWS may be necessary if any impacts to federal special status species are identified. A DFG 1601 permit and Army Corps of Engineers 404 permit may be needed. A NPDES permit may be needed from the State Water Resources Control Board.

Tree of heaven is intermingled in a number of areas in the OWA with valley elderberry bushes (habitat for the federally threatened valley elderberry longhorn beetle) and appears to be expanding. In areas where the two species coexist, the taller tree-of-heaven will eventually shade out and replace the existing elderberry bushes. Expansion of the tree of heaven will further impact available habitat. Although removal of the tree of heaven may temporarily impact the elderberry plants, it's believed that in the long-term removal will improve the habitat.

Synergism and Conflicts:

The goal of this resource action is to eliminate and/or control noxious weed species in the Project area. Other resource actions listed above address purple loosestrife control in the Project Area, water primrose control in the OWA, and weed control along the low flow section of the Feather River. Each of these resource actions also has a replanting/restoration component. An overall Weed Management Plan for the Project Area will increase the likelihood of success for eradication and control of these species and ultimately decrease the invasion into downstream waters and habitats. A number of considerations will influence the choice of options for the individual species, including the expected level of success and the desired land use objective.

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Removal of noxious weed species and replanting with native species will compliment those resource actions that address riparian/wetland and upland habitats, as well as those that address special status species habitats.

No potential conflicts with other resources or resource actions have been identified at this time.

Uncertainties:

Uncertainties include:

- effectiveness of control and eradication methods
- long-term costs
- determining time frame for controlling weed populations
- impacts to plant and animal species that may be added to special status lists in the future
- species that may become high priority weed species in the future

Cost Estimate:

An initial cost estimate for this resource action is difficult because:

- costs will vary depending on target species and goals identified in management plan
- costs will vary depending on method or methods used. A mix of techniques may be appropriate
- the uncertainties in predicting success of management methods and advances in technology or strategies over time
- costs will be higher for the first year or two, but should decline over time
- may be more cost effective to use consultant services for some species

Estimated costs of removal vary from source to source and highly depend on the target species. Invasive species control costs have been estimated at \$500-1,500 per acre. A Cal IPC report estimates costs of weed control using glyphosate as \$185-\$200/acre. Costs of non-native species removal along the American River using a combination of mechanical mowing/cutting and herbicides ran \$1,000/acre for mechanical treatment; \$50/acre for herbicides, and another \$50/acre for operations, maintenance, and monitoring. Target species included scarlet wisteria, Himalayan blackberry, giant reed, Spanish broom, fennel, and black locust. Estimates for giant reed removal are ~\$250/acre.

Restoration costs: ~ \$20 - \$800 per acre
~ uncertain as to number of acres to be restored

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Recommendations:

This resource action should be combined with other resource actions that target the eradication and/or control of noxious weed species. A weed management plan for the project area and project-affected area should be developed using an adaptive management strategy. This plan should include management goals and objectives, priorities, implementation strategies, cost and time estimates, restoration, and monitoring to assess impacts of management activities and effectiveness of methods.

Literature Cited:

Bell, Gary. 1997. Ecology and management of *Arundo donax*, and approaches to riparian habitat restoration in Southern California. In Brock, J.H., Wade, M., Pysek, P., and Green, D. (Eds.); *Plant Invasions: Studies from North America and Europe*. Blackhuys Publishers, Leiden. The Netherlands, pp. 103-113.

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